

[Editor's Note: The following report is an electronic reproduction of the 18th annual progress report to the State Water Resources Control Board. The format of this chapter is different than the original report. The page numbers listed in this table of contents still reflect the page numbers from the original document.]

TABLE OF CONTENTS

INTRODUCTION.....	1
DSM2 MODEL DEVELOPMENT	3
Source Code Changes.....	3
Input / Output System	2-2
Graphical User Interface	2-2
Hydrodynamics Module (HYDRO).....	2-2
Water Quality Module (QUAL)	2-2
Particle Tracking Module (PTM)	5
Land Processes Module (DICU)	5
DSM2 Calibration and Verification	7
HYDRO	7
QUAL.....	7
Summary of Calibration and Verification	8
Sensitivity Analyses	9
HYDRO	9
QUAL.....	12
HYDRO Application.....	12
Channel Geometry	13
Discussion of Results.....	14
HYDRO Application Summary	14
Future Directions	15
MARGINAL EXPORT COST AND MDO REPLACEMENT	83
Carriage Water Findings Using Artificial Neural Networks	83
Replacement of MDO with ANNs in DWRSIM	84
Future Directions	85
HOME PAGE STATUS	99

TABLES

Table 2.1a:	1993 DWR and USGS 15-Minute Flow Data.....	17
Table 2.1b:	1994 DWR and USGS 15-Minute Flow Data.....	18
Table 2.1c:	1995 DWR and USGS 15-Minute Flow Data.....	19
Table 2.2:	Summary of Five CALFED Alternatives.....	13
Table 2.3:	Comparison of HYDRO Results to DSM1 at Eight Delta Locations	14

FIGURES

Figure 2.1:	Miner Slough and Steamboat Slough	20
Figure 2.2:	Georgiana Slough near Sacramento River.....	21
Figure 2.3:	North Fork Mokelumne River below Snodgrass Slough; South Fork Mokelumne River	22
Figure 2.4:	Three Mile Slough; San Joaquin River at Jersey Point.....	23
Figure 2.5:	Sacramento River South of Decker Island.....	24
Figure 2.6:	San Joaquin River at Highway 4; Old River below Tracy Road	25
Figure 2.7:	Columbia Cut; Turner Cut	26
Figure 2.8:	Grantline Canal; Old River near Clifton Court Forebay	27
Figure 2.9:	Old River at Bacon Island; Middle River at Bacon Island	28
Figure 2.10:	Potato Slough; Honker Cut	29
Figure 2.11:	Piper Slough; Dutch Slough.....	30
Figure 2.12:	Sacramento River above Delta Cross Channel Residual Flow; Sacramento River below Georgiana Slough Residual Flow.....	31
Figure 2.13:	Delta Cross Channel Residual Flow	32
Figure 2.14:	Old River at Bacon Island; Middle River at Bacon Island	33
Figure 2.15:	Old River at Bacon Island Residual Flow; Middle River at Bacon Island Residual Flow	34
Figure 2.16:	Central Delta Residual Flow (Old + Middle River).....	35
Figure 2.17:	Sacramento River at Freeport; Sacramento River at Delta Cross Channel	36
Figure 2.18:	Sacramento River below Georgiana Slough	37
Figure 2.19:	Sacramento River at Freeport Residual Flow; Sacramento River at Delta Cross Channel Residual Flow	38
Figure 2.20:	Sacramento River below Georgiana Slough Residual Flow.....	39
Figure 2.21:	Steamboat + Sutter Slough Residual Flow; Cross Delta Residual Flow (DXC + Georgiana Slough).....	40
Figure 2.22:	Three Mile Slough; San Joaquin River at Jersey Point.....	41
Figure 2.23:	Three Mile Slough Residual Flow; San Joaquin River at Jersey Point Residual Flow.....	42
Figure 2.24:	Sacramento River above Delta Cross Channel; Sacramento River below Georgiana Slough	43
Figure 2.25:	Sacramento River above Delta Cross Channel Residual Flow; Sacramento River below Georgiana Slough Residual Flow.....	44
Figure 2.26:	Three Mile Slough; San Joaquin River at Jersey Point	45
Figure 2.27:	Three Mile Slough Residual Flow; San Joaquin River at Jersey Point Residual Flow.....	46
Figure 2.28:	Martinez; Mallard Island.....	47
Figure 2.29:	Antioch; Three Mile Slough.....	48
Figure 2.30:	Collinsville; Rio Vista.....	49
Figure 2.31:	Mallard Island; Collinsville.....	50

Figure 2.32:	Emmaton; Rio Vista	51
Figure 2.33:	Antioch; Jersey Point	52
Figure 2.34:	Holland Tract; Contra Costa Canal Pumping Plant #1	53
Figure 2.35:	Victoria Island; Union Island	54
Figure 2.36:	Stockton; Mossdale	55
Figure 2.37:	Pittsburg; Collinsville	56
Figure 2.38:	Emmaton; Rio Vista	57
Figure 2.39:	Antioch; Jersey Point	58
Figure 2.40:	Holland Tract; Contra Costa Canal Pumping Plant #1	59
Figure 2.41:	Victoria Island; Union Island	60
Figure 2.42:	Stockton; Mossdale	61
Figure 2.43:	Run 39.0.....	62
Figure 2.44:	Run 38.2.....	63
Figure 2.45:	Three Mile Slough; San Joaquin River at Jersey Point	64
Figure 2.46:	Three Mile Slough; San Joaquin River at Jersey Point	65
Figure 2.47:	Antioch; Emmaton; Jersey Point.....	66
Figure 2.48:	QWEST for Various CALFED Alternatives Historic Boundary Tide at Martinez, DSM1	67
Figure 2.49:	Flow Past Chipps Island CALFED Alternatives Historic Boundary Tide at Martinez, DSM1	68
Figure 2.50:	Flow in Lower Old River at San Joaquin River CALFED Alternatives Historic Boundary Tide at Martinez, DSM1.....	69
Figure 2.51:	Flow in Lower Middle River at San Joaquin River CALFED Alternatives Historic Boundary Tide at Martinez, DSM1.....	70
Figure 2.52:	Flow in Columbia Cut CALFED Alternatives Historic Boundary Tide at Martinez, DSM1	71
Figure 2.53:	Flow in Turner Cut CALFED Alternatives Historic Boundary Tide at Martinez, DSM1	72
Figure 2.54:	Flow in Old River at Santa Fe RR CALFED Alternatives Historic Boundary Tide at Martinez, DSM1	73
Figure 2.55:	Flow in Middle River at Santa Fe RR CALFED Alternatives Historic Boundary Tide at Martinez, DSM1.....	74
Figure 2.56:	QWEST for Various CALFED Alternatives Historic Boundary Tide at Martinez, DSM2	75
Figure 2.57:	Flow Past Chipps Island CALFED Alternatives Historic Boundary Tide at Martinez, DSM2	76
Figure 2.58:	Flow in Lower Old River at San Joaquin River CALFED Alternatives Historic Boundary Tide at Martinez, DSM2.....	77
Figure 2.59:	Flow in Lower Middle River at San Joaquin River CALFED Alternatives Historic Boundary Tide at Martinez, DSM2.....	78
Figure 2.60:	Flow in Columbia Cut CALFED Alternatives Historic Boundary Tide at Martinez, DSM2	79
Figure 2.61:	Flow in Turner Cut CALFED Alternatives Historic Boundary Tide at Martinez, DSM2	80
Figure 2.62:	Flow in Old River at Santa Fe RR CALFED Alternatives Historic Boundary Tide at Martinez, DSM2.....	81
Figure 2.63:	Flow in Middle River at Santa Fe RR CALFED Alternatives Historic Boundary Tide at Martinez, DSM2.....	82
Figure 3.1a:	ANN Multiple Input Model	87
Figure 3.1b:	ANN NDO Only Model	87
Figure 3.2a:	ANN Multiple Input Model	88
Figure 3.2b:	ANN NDO Only Model	88

Figure 3.3a:	ANN Multiple Input Model	89
Figure 3.3b:	ANN NDO Only Model	89
Figure 3.4a:	ANN Multiple Input Model	90
Figure 3.4b:	ANN NDO Only Model	90
Figure 3.5:	Time Series Plot Continuous Impulse Marginal Export Cost at Pittsburg	91
Figure 3.6:	Time Series Plot Continuous Impulse Marginal Export Cost at Jersey Point.....	92
Figure 3.7:	Time Series Plot Continuous Impulse Marginal Export Cost at Contra Costa Canal	93
Figure 3.8:	Time Series Plot Continuous Impulse Marginal Export Cost at Clifton Court Forebay.....	94
Figure 3.9:	Contra Costa Canal TDS (ANN Trained with Historic DXC) Oct. 1, 1976 – Sep. 30, 1981	95
Figure 3.10:	Pittsburg TDS (ANN Trained with Historic DXC) Oct. 1, 1976 – Sep. 30, 1981	96
Figure 3.11:	Contra Costa Canal TDS (ANN Trained with Historic and Inverted DXC) Oct. 1, 1976 – Sep. 30, 1981	97
Figure 3.12:	Pittsburgh TDS (ANN Trained with Historic and Inverted DXC) Oct. 1, 1976 – Sep. 30, 1981	98